

Remarks/Arguments

Applicant thanks Examiner Le for his patient and careful examination of this application and for the clear explanation of the claim rejections. In response to the Office Action of February 14, 2007, applicant amends claim 6 so it properly depends from claim 4.

The Office Action rejected all pending claims 1, 3, 4, 6, 8 through 11, and 28 through 33. Claims 1, 4, 8 through 11 and 28 through 33 are rejected as being unpatentable over US 5666270 to Matsuda et al. in view of US 6919264 to Brintzinger et al.; claim 3 is rejected over Matsuda et al. and Brintzinger et al. and in view of US 5187020 to Kwon et al.; and claim 6 is rejected over Matsuda et al. and Brintzinger et al. and in view of US 6211572 to Fjelstad et al.

Claims 1 and 30 are independent claims. Claims 3, 4, 6, 8 through 11, 28 and 29 depend from claim 1; and claims 31 through 33 depend from claim 30.

The Office Action points to the Matsuda patent, specifically the structure depicted in fig. 7A-F as disclosing a structure having a compliant layer 35 and an inner portion of a contact pad over the compliant layer having a thickness thinner than the thickness of the outer portion of the contact pad. Applicant respectfully submits that the figures do not accurately describe structure and the detailed description in the Matsuda patent proves the inaccuracy.

Figures 7A through 7F refer to the method of producing a bump electrode:

A description will now be given, with reference to FIGS. 7A through 7F, of the method of producing the bump electrode 30 shown in FIG. 4.¹

Figure 7E and 7F depict a conductive film 36, which has a thickness t_2 in the range of 5 – 20 μm . In figures 7E and 7F, the conductive film 36 seems to be thinner at the top of the bump 35 than at the side of the bump, which is the base upon which the Office Action suggests that Matsuda disclosed the element in claim 1 and claim 30 of this application. However, in the more detailed and

¹ US 5,666,270, col. 5, ll. 11-13.

accurate drawing figure 4, this conductive film is clearly shown to have the same thickness "d" at the top of the bump 35 as well as on the side of the bump. And the detail description of the process method verifies this fact:

FIG. 7E shows step 54 of forming the conductive film 36. In step S54, evaporating or plating of Au is performed so that the conductive film 36 having a thickness t_2 of 5 to 20 μm is formed on the surface of the core portion 35. Thereby, the bump electrode 30 is formed.²

This description clearly indicates that the conductive film 36 has one thickness; rather than a thickness at the top and a different thickness on the side. The range of the film - 5 to 20 μm is the process tolerance of the film thickness in manufacturing. Furthermore, it is well known in the art of semiconductor device processing that thickness uniformity of evaporated films is required for the quality and the functionality of the devices. The Matsuda reference gives no apparent reason that the thickness of the film 36 be non-uniform.

The Brintzinger patent also clearly shows a stack of metal films of uniform thicknesses extending over a "resilient or compliant contact bump." So the Brintzinger reference does not cure the deficiency of the Matsuda reference.

In summary, applicant respectfully submits that both independent claim 1 and claim 20 include at least one element that is not disclosed in the Matsuda reference and the Brintzinger reference. Therefore claim 1 and claim 30 and their dependent claims must not be rendered obvious over the references.

² Id. col. 5, ll. 37-41.

Appl. No. 10/750,059
Amdt. dated June 13, 2007
Reply to Office action of Feb. 14, 2007

In light of the remarks and Applicant respectfully requests further examination of this application and timely allowance of all the pending claims.

Respectfully submitted,

/Yingsheng Tung/

Texas Instruments Incorporated
P. O. Box 655474 MS 3999
Dallas, TX 75265
(972) 917-5355

Yingsheng Tung
Reg. No. 52,305
Attorney for Applicant